

WHAT IS CLAIMED IS

1. A method of separating and purifying a negatively charged target biopolymer from among biological samples, comprising the steps of:

partitioning between a first solution containing said biological samples and a second solution for preserving separated and purified biopolymers with the use of a gel; movement of said target biopolymer from within said first solution through said gel into said second solution using electrophoresis; and

separation and purification of said target biopolymer.

2. The biopolymer separation and purification method of claim 1, comprising the steps of:

partitioning among said first solution, said second solution, and a third solution for preserving biopolymers with the use of said gel in three directions;

movement of said biopolymer, which has been moved from within said first solution to said gel using electrophoresis, into said second solution or said third solution; and separation and purification of said target biopolymer.

3. The biopolymer separation and purification method of claim 1 or claim 2, wherein a very small pillar array or a porous filter is used as said gel.

4. A biopolymer separation and purification apparatus, wherein a negatively charged target biopolymer is separated and purified from among biological samples, comprising:

a first solution containing said biological samples;

a second solution for preserving separated and purified biopolymers;

an electrophoresis container carrying a gel to partition said first solution from said second solution;

positive and negative electrodes provided to move said

negatively charged biopolymer from within said first solution through said gel into said second solution using electrophoresis; and

a power supply for applying positive and negative voltages to said positive and negative electrodes respectively, wherein biopolymer separation and purification can be performed by applying voltages to said electrodes and moving said target biopolymer from within said first solution through said gel to said second solution.

5. The biopolymer separation and purification apparatus of claim 4, wherein a third solution is carried in said container in order to contact said gel in a direction different from directions of said first solution and said second solution and to preserve said biopolymer moved through said gel, comprising:

positive and negative electrodes for electrophoresis which are provided to move said negatively charged biopolymer from said gel into said third solution using

electrophoresis; and

a power supply for applying positive and negative voltages to said positive and negative electrodes respectively, wherein biopolymer separation and purification can be performed by moving said target biopolymer into said second or third chamber through the switching of movement directions caused by electrophoresis.

6. The biopolymer separation and purification apparatus of claim 4 or claim 5, wherein a very small pillar array or a porous filter is used as said gel.

7. A biopolymer separation and purification method, wherein a negatively charged target biopolymer fixed to a magnetic bead is separated and purified from among biological samples, comprising the steps of:

partitioning of a first solution containing said biological samples, a second solution for preserving

separated and purified biopolymers, and a third solution for preserving a separated and purified target biopolymer fixed to a magnetic bead from each other with the use of a gel;

movement of biopolymers from within said first solution through said gel into said second solution using electrophoresis;

movement of said target biopolymer fixed to a magnetic bead, which is in transit in said gel, into said third solution using magnetophoresis; and

separation and purification of said target biopolymer.

8. The biopolymer separation and purification method of claim 7, wherein a very small pillar array or a porous filter is used as said gel.

9. A biopolymer separation and purification apparatus, wherein a negatively charged target biopolymer fixed to a

magnetic bead is separated and purified from among biological samples, comprising:

a first solution containing said biological samples;

a second solution for preserving separated and purified biopolymers;

a third solution for preserving a separated and purified target biopolymer fixed to a magnetic bead;

a container carrying a gel to partition these three solutions from each other;

positive and negative electrodes provided in said container to move negatively charged biopolymers from within said first solution into said gel and said second solution using electrophoresis;

a power supply to apply positive and negative voltages to said positive and negative electrodes respectively; and

a magnetic field generation means wherein a magnetic field is generated in order to move said target biopolymer fixed to a magnetic bead, which is in transit in said gel using

electrophoresis, into said third solution using

magnetophoresis,

wherein biopolymer separation and purification can be performed by moving said target biopolymer fixed to a magnetic bead into said third solution using electrophoresis and magnetophoresis.

10. The biopolymer separation and purification apparatus of claim 9, wherein a very small pillar array or a porous filter is used as said gel.

11. The biopolymer separation and purification apparatus of claim 9 or claim 10, wherein an electromagnet, an electromagnetic coil, or a permanent magnet is used as said magnetic field generation means.